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Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION



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MINISTER EXPRESSES INTEREST IN NUCLEAR TECHNOLOGY FROM SWEDEN

Stockholm DAGENS NYHETER in Swedish X 9 Jun 84 p 8

[Article by Hakan Rylander: "South Korean Minister Here; He is Interested in Nuclear Power"]

[Text] South Korea is interested in Swedish technology to reduce its dependency upon the United States and Japan, and they also regard Sweden as a suitable partner for joint projects in third countries.

That is the main reason for the three-day visit to Sweden of South Korea's minister of trade and industry, Kum Chin Ho, which ends today.

South Korea has had rapid economic growth, and trade with Sweden has also increased steadily.

"I believe that the rate of increase in the volume of trade can be even faster during the coming years. There is a big potential for growth," Kum Chin Ho says.

Several Swedish enterprises are already involved in big projects in South Korea. The best known such project is probably Ericsson's billion kronor order for expanding the Korean telecommunications network.

As examples of other areas where there is Swedish participation at the present time, Kum Chin Ho mentions nuclear power, fast trains and subway construction.

In both Swedish and South Korean circles, there is great interest in increased cooperation in so-called joint ventures in third countries.

"The combination of advanced Swedish technology and qualified Korean manpower can be very effective," Kum Chin Ho says.

The South Korean minister is a great advocate of free trade and says he has found a friend in Swedish Minister of Trade Mats Hellstrom. The most important limitation on Swedish imports from South Korea is the quota on imports in the area of textiles and ready-made clothing.

"There are restrictions of that sort in almost all countries, and we can understand them, even though we naturally would prefer to see them all removed," Kum Chin Ho says.

Evened Out

Swedish exports to South Korea have increased sharply in recent years, and they went up to 916 million kronor worth last year, which is more than twice as much as in 1982. The corresponding figure for imports from South Korea was 941 million kronor worth.

Sweden has traditionally had a big deficit in its trade with South Korea, but that has now been almost evened out.

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SPECIAL REPORT ON NUCLEAR PLAN GOALS, RESEARCH PRIORITIES

Applications, Resources, Plants Discussed

Buenos Aires LA NACION in Spanish 31 May 84 pp 21-23

[Text] Energy and Health, Goals of the Nuclear Plan

Engineer Alberto Costantini, chairman of the CNEA [National Commission for Atomic Energy], told a LA NACION reporter: "The Argentine nuclear program is the same as the one carried out in previous years, and the Nuclear Plan that is under way is backed by decrees of 1977 and 1979, which defined the main features of the activity of the National Commission for Atomic Energy."

In response to the widespread uneasiness regarding the plan's future, he said that the agency's budget includes all of the six work programs, "coordinated consistently and combined to meet the country's needs."

Included in these programs, engineer Costantini cited the projects for the construction and operation of nuclear powerplants, "of which the country already has two in operation, Atucha I and Embalse; one under construction, Atucha II; and three more planned to be built by the end of the century. Simultaneously, CNEA has developed all aspects of the nuclear fuel cycle, seeking the nation's technological independence. This involves exploration for, and extraction of uranium, production of concentrate, manufacture of fuel elements and production of heavy water, an essential input for the powerplants. Completing the fuel cycle has been a very praiseworthy effort on CNEA's part."

Economic and Social Development

All these technological and industrial operations have been accompanied by work involving radiological safety and protection, a field in which Argentina has leading experts and extensive research and development programs. "These protection and safety activities, as well as those involving scientific and technical research, are continuing to be carried out normally. As for the scientific studies, CNEA will soon have the important Tandem accelerator, which will be at the disposal of Argentine physicists for their experiments. I would also like to emphasize the importance of the atomic centers, the Balseiro Institute and the Pilcaniyeu laboratories, where a group of the commission's researchers achieved the enriched uranium technology."

Many have wondered why Argentina wanted to develop the enriched uranium technology. According to engineer Costantini, that accomplishment has a very clear-cut purpose: "There is an area of activity in the National Commission for Atomic Energy which is less spectacular than the nuclear electric powerplants, but of no less importance. It is the one for applications of radioisotopes to benefit human life. These radioisotopes depend largely on the existence of experimental reactors which use enriched uranium precisely. At the time in which we are living, the country is devoting major efforts to health and nutrition, to policies of a social nature. And, in this respect, the radioisotopes and radiation program assumes unique significance, because it provides the means for improving health and promotes food production."

The CNEA Personnel

Costantini had special regard for the CNEA personnel. "A few days ago, I was at Embalse. I held meetings with all the personnel; one with the plant engineers. I was prepared to listen to complaints on the problems of salaries and regarding work. But I had a great surprise: After I addressed them, the engineers expressed their concerns to me. They asked me what we would do to obtain the necessary spare parts for the powerplant, how we would meet the needs for foreign exchange, etc. That is the spirit of the CNEA personnel, people who have received excellent scientific, technical and professional training, and who are completely willing to do everything possible to maintain what has been accomplished and to back what still remains to be done. The country cannot waste all that."

CNEA Is Not Oversized

In commenting specifically on the budget, Costantini claimed that it is ridiculous to claim that CNEA is oversized. "Something of great social usefulness cannot be oversized. What aids development cannot be oversized. One could talk about oversizing if it involved luxury goods or weapons production, but this involves only activities of value to the Argentine society as a whole, for economic and social development. Furthermore, in the energy program, when the country resumes its normal productive course, the demand for electricity will resume the curve that has been interrupted; and, in this respect, we must consider the fact that hydroelectricity and thermal powerplants will be unable to meet the demand. Then there will clearly arise the need for nuclear powerplants for the coming years, particularly after 2000. At that time, Argentina will be able to make use of this entire store of unvaluable scientific and technical knowledge that it possesses and cannot lose."

Coinciding with Atomic Energy Day, CNEA is opening an exhibit that it has called "Atoms for Life," at the General San Martin Municipal Theater. "This is the beginning of a public campaign to put an end to the mystery, the fantasies and the opposition to the nuclear activities in Argentine." Costantini concluded by saying: "I am sure that even the most persistent opponents of nuclear energy will realize why we must preserve this all-important asset that we have."

Priorities for Research and Progress

During the first years of its existence, the National Commission for Atomic Energy was devoted basically to research activities. With the passage of time, and particularly after the period wherein Jorge A. Sabato encouraged the study of nuclear metallurgy, the agency assumed a greater impetus and many lines of activity were opened up in all the areas associated with the energy of the atomic nucleus.

Physicist Mario Mariscotti, who was put in charge of the Research and Development Department a few months ago, underscored the importance of the intellectual assets contained in CNEA's laboratories and research and development centers. He commented: "At the present time, budget problems are affecting research and development activities to a lesser degree than the large projects, such as Atucha II or the heavy water plant, for example. But, in any event, the salary aspect does concern us: The young professionals and technicians are at very low salary levels, and this jeopardizes the integrity of the institutions and, what is even worse, their future. When faced with an offer from a private firm or a bid from abroad which doubles or even triples the salary that CNEA can pay, the young person, whose training has been costly for the country, has no alternative. He goes."

On the other hand, Argentine scientists residing abroad are expressing their desire to return. And Mariscotti asks: "How can they be received if our institutions are frozen and there are such salary difficulties? This situation explains our reason for requesting an end to the freeze at the institution, not to expand the state bureaucracy, as has been claimed, but rather to preserve that scientific patrimony, all that gray matter that we must not lose. Suffice it to say that a professional with a few years' experience, sometimes trained abroad, earns about 15,000 pesos."

In any event, the lack of approval for the CNEA budget, added to the shortage of funds issued by the Treasury, have caused all activities to have to be managed with extreme savings of resources. Mariscotti adds: "Nevertheless, an attempt has always been made, and now we are also following that policy of not upsetting the basic scientific research. We realize that, often, when there are difficult budgetary situations, there appears the temptation to cut funds for research; but we must not and do not want to do so. Currently, basic research occupies a moderate position, a tenth of what is allocated for what is usually termed applied research. The return will not be immediate, but there is an extraordinary benefit, since Argentina can have available a group of scientists on an international level, who are valid spokesmen in the rest of the world."

The Fuel Cycle

It is in the area of the Research and Development Department that the initial steps were taken toward the various lines of activity associated with the positive nuclear fuel cycle. Mariscotti remarks: "In the department we have

basic research groups specializing in nuclear physics, with instruments as important as Tandem or heavy ion accelerators, technological development laboratories specializing in materials and nuclear metallurgy, and also production activities."

Other areas in which the Research and Development Department is involved are the reprocessing of irradiated uranium, and the production of enriched uranium for the experimental reactors, including technology of these reactors, as well as services to industry, through agencies such as SATI [Service for Technical Assistance to Industry], which is engaged in the transfer of technology, or INEND, a non-destructive test laboratory.

To this group of activities that have made a highly significant contribution to the country in the realm of technological independence, the Research and Development Department has added a view toward the future. Mariscotti notes: "The prospective groups are studying solar and aeolic energy, and the possibilities of fusion. The latter area is of particular interest, because the country must have people trained to monitor closely what is being done in the more industrialized countries which are attacking the problem on a large scale. We are attempting to maintain, in this area, as we have done very successfully in so many others, a level of knowledge that will enable us to know what and how to purchase, when necessary, because that condition is part of the technological independence."

In conclusion, the director of research and development remarks that the other prospective group is working on a study of small reactors. "It was always thought that the large reactors were cheaper. Now, it would appear that this is not so true, which affords some very interesting prospects. A small reactor is more usable and the possibilities for application are increased. Moreover, they may be even safer, because of their small size and the lesser difficulties in construction. For the present, it is a topic of study."

Economic Yield and Safety

Engineer Jorge Bertoni, director of nuclear powerplants for CNEA, claims: "The 10 years of Atucha I operation prove that nuclear electricity is a safe, reliable and economical alternative." During all these years, Atucha has ranked among the best powerplants in the world, with an average availability factor of 82 percent, which could have been even higher if there had not meanwhile been a reduction in demand. He adds: "The Embalse powerplant, for its part, with nearly 5 months of commercial operation, shows the same features."

In addition to being a safe, reliable and economical alternative, nuclear electricity is a perfect complement to hydroelectricity. Bertoni remarks: "The nuclear plants are base load powerplants, which operate 24 hours; because a high construction cost is offset by a low fuel cost. On the other hand, the hydroelectric powerplants, for technical reasons, can only be semi-base or peak. Therefore, it is completely useless to embark on discussions as to whether one or the other type is more feasible. They are complementary."

The Nuclear Plan

With the nation's decision made to develop nuclear electric energy using natural uranium and heavy water, a decision adopted at the beginning of the 1970's, the nuclear plan defined in 1979 indicated the construction of four powerplants by the end of the century. Bertoni continued: "At present, Argentina has two powerplants in operation, based on two different concepts of the type of reactor, two options for the use of natural uranium and heavy water. This has enabled us to evaluate the good features of both types of reactors, to which is added the experience gained through the increasing national participation in powerplant construction."

Effectiveness of Argentine Engineering

The example of Atucha II, currently under construction, reveals another step in the mastery of nuclear powerplant engineering. Bertoni stresses: "For this powerplant, a contract was made which gave up the turn-key notion. The components and services were contracted for with the firm KWU, while the industrial architecture has been assigned to an Argentine company ENACE, S.A., [Argentine Nuclear Enterprise for Electrical Powerplants], comprised of 75 percent represented by CNEA and the rest by KWU. Based on the terms of the contract, ENACE is the recipient of the technology developed by KWU. The original idea was that ENACE would gradually become responsible for the future powerplants in the Nuclear Plan, three more by the end of the century."

Bertoni maintains: "This entails reconsidering the Nuclear Plan, for which purpose there are CNEA specialists participating in that study. In any event, there may be a change in dates and numbers of powerplants, but we have no doubt that another powerplant will be built after Atucha II, by the end of the century."

Human and Industrial Resources

He claims that the need to preserve and bolster the country's overall experience in the nuclear electric field "makes it essential for this to happen, because we have an extremely valuable asset in the form of human resources and industrial capacity. The preservation of this patrimony will enable us to attain the main goal of 34 years of effort: arriving at the year 2000 with the mastery of a technology that will make it possible for us to be self-sufficient when the other resources are really meager."

Safety Barriers

One of the fears most often expressed by the population relates to the possibility of accidents in a nuclear powerplant. According to Bertoni, this deserves public attention and disclosure: "The maximum thinkable risk that could affect the population surrounding a nuclear powerplant would be a radioactive leak, because (he notes in particular) a powerplant cannot blow up as many people think. It might, indeed, happen that a coolant duct could break

and the fission products be disseminated. But, in the first place, the uranium cake of itself retains a large portion of these products. Furthermore, they are encapsulated in airtight zircaloy tubes. Those tubes, for their part, integrating the fuel elements, are located in the primary circuit of the reactor, which is also airtight. And, finally, all of this is confined to the containment area, which is also airtight."

Isotopes and Radiation

Ever since the researcher George Hevesy discovered that the mistress of his boarding-house was using leftovers for meals, introducing a radioactive isotope into his plate, the use of radioactive tracers has been a major contribution from nuclear energy to health, industry, agriculture and scientific research.

Since the first years of its existence, the National Commission for Atomic Energy has developed these applications, currently contained in the Radioisotopes and Radiation Program. At the CNEA facilities, radioisotopes and sealed sources of cobalt 60 are produced, engineering services are provided for production facilities and biological, medical, technological, industrial and agricultural applications are made.

National Standing, Foreign Contracts

Buenos Aires LA PRENSA in Spanish 31 May 84 pp 6-7

[Text] Costantini: 'The General Features of the Nuclear Plan Are Being Retained'

Today, our country is celebrating Atomic Energy Day. On this occasion, an interview was held with the chairman of the National Commission for Atomic Energy, engineer Alberto Costantini, so that he might establish the sector's current status in Argentina. He replied: "Based on the policy announced by the president of the nation on 11 May at Atucha, the commission is retaining the general features of the nuclear plan established previously. Hence, the construction of atomic powerplants, the fuel cycle, the activities relating to radiological protection and safety, the training of human resources, the research and development work, as well as the Nuclear Supplies Department and, essentially, the one for radioisotopes and applications, still have the same activities that they had virtually begun in 1977, with the nuclear plan that is in effect. The recent budget, which cuts large investments in the area of public works, will not affect the commission with regard to technological innovations or scientific development, nor the work of the professionals and technicians, whether it be in the laboratories, offices and pilot plants or in the incipient industrial plants that the commission has available. In brief, this means that we can continue with the line that had been devised in earlier years and that there will be some delay in completing the projects which have been started, whether it be Atucha II, the heavy water plant or the plant for reprocessing burned fuels. The lag will consist of about 12 months with respect to the work timetables that these projects had at the beginning of the year."

On the subject of the participation by national technology in nuclear development, engineer Costantini remarked that it is increasing more every day and that, in the construction of a powerplant, for example, its percentage of intervention is increasingly higher, reducing the total volume of supplies from abroad.

With regard to our country's status in the atomic field on the international level, the chairman of CNEA commented that we rank among the six or seven most advanced countries in the world in the area of technological development, and that, in specific instances such as the areas of radiological protection and safety, we rank in third or fourth place.

Finally, in connection with the day's celebration, engineer Costantini pointed out that it has been 34 years since the first decree which created the National Directorate, that was the starting point for the laboratory work, invading areas of nuclear physics which were as yet unknown. Later, they arrived at pure research, and thereafter, applied research, and the advances of the present time were achieved without a letdown in continuity.

He added that, on the occasion of the commemorative date, "We have set up a small display in the Morel Room of the General San Martin Theater, to publicize the different applications being developed by our commission in the fields of medicine, biochemistry, biology, genetics, culture, engineering and industry, to show the commission's inclusion in the republic's economic and social development."

"I would like, and I also expect that, when the current crisis has been surmounted, we shall be able to undertake the advance of the projects more energetically. If any concern bothers me, it is that this reduction in its pace represents a serious expense, as a result of the unproductive spending of various kinds that it causes when we fail to fulfill the contractual relations that we had with suppliers, contractors or subcontractors. I trust that, by 1985, we shall be able to resume the course and, although with some delay, we shall be able to put the plants called for in 1990 into operation; so as to give nuclear energy the important share that it deserves in the national energy plan."

Long-Term Agreements With Private Firms

On the subject of nuclear energy, never before has so much been published as there has lately on the part of the so-called "pro-nuclears" or "non-nuclears" or "anti-nuclears," whether they be experts or laymen in the field. This statement was made by Oscar A. Quihillalt, an Argentine expert in the atomic field, who added: "The rumors that were circulating during the first months of the year, without reaching a state of crisis, as was appropriately denied by the chairman of the National Commission for Atomic Energy, brought about the creation of an alarming situation, which was not overcome until the president of the nation, in his speech during the visit to the Atucha I and II nuclear powerplants, restored equanimity. So, reassured, and with the assurance that atomic energy will continue, let us try to contribute something

good. And at the present time, in view of the large amount of publicity that has been given to the subject, it seems to me most fitting to confine myself to a minor problem which, when solved, could help us to have a better, more efficient nuclear organization, wherein CNEA would be encouraging private industry and engineering until it has caused them to attain a higher level." Dr Quihillat went on to say: "That encouragement has been reflected in suitable contracts, on the one hand, and in economic assistance enabling specialized personnel to reside abroad, acquiring the necessary technology with which to have an opportunity to apply it here. In most instances, they have been contracts at an hourly rate, depending on the classification of the personnel employed, and the companies have not had complete responsibility. Thus, there was the advantage of interesting private engineering, prompting the establishment of companies devoted entirely to nuclear matters, with major personnel training. Hence, three Argentine firms which took part in the construction of the Embalse powerplant were able to make an offer to install a nuclear powerplant for a leading international company which in turn has submitted a bid to Egypt." He noted: "Now that the continuation of the nuclear plan has been confirmed, I think that there might be a change in the contracting procedure, for the good of CNEA and the companies. Instead of having the latter associated with the commission through contracts for lending personnel to work at an hourly rate, we should move to a different type of long-term contracts that would guarantee a stable market, with the private firms assuming further responsibilities. This would make it possible for them to know in advance the types, volumes and approximate dates of jobs that they will be doing, becoming thoroughly familiar with the situation in time, and being able to train the specialized personnel. The objection is made to this that the law on accountability does not allow it, although I think that, with wise handling thereof many problems could be solved. This has been achieved in some countries, such as France, where FRAMATOME [Franco-American Atomic Construction Company] and other private firms have established their responsibilities in certain major activities in advance. The same thing holds true in Italy where, through close cooperation between Comitente and the engineering firm, a plant with "national" features can come into existence and develop, facilitating the incorporation of autonomous technology and the maintenance of a high employment level."

He remarked: "On the other hand, it should not be forgotten that technology is evolving very rapidly at present. It is not enough to learn the technology which affords what I called in a lecture that I gave recently ritual duplication. There must be an intensification of our own research, both so as to be able to totally absorb what has been purchased and to generate a new type. Otherwise, upon carrying out a new development, let's say 5 or 7 years later, we would be applying an old technology, or we would inevitably have to purchase the new one again."

"The government agency, with its excellent personnel, laboratories and budget, combined with the companies' industrial capacity and part of their profits, will be able to carry on very valuable developments both in the scientific and technical fields and in that of industrial development and in the economics of foreign marketing, which is virtually unknown."

Business Report

The representatives of Atomic Energy of Canada Limited in this country released the following report on the firm's activities in Argentina and abroad, as well as on the projection of its plans for the future.

Last year, five Candu type nuclear powerplants for generating electricity reached production at full power; one of the 600 MW powerplants was the Embalse Rio Tercero plant located in Cordoba Province.

The 600 MW units have continued to maintain the excellent performance achieved by the older reactors, clearly demonstrating that the Canadian design reactors using natural uranium as fuel and heavy water as a moderator and coolant surpass all the other reactor systems.

The capacity factors attained by the 600 MW reactors since their entry into services speak for themselves. By the end of April 1984, the Point Lepreau powerplant in New Brunswick, Canada, had achieved a cumulative capacity of 88 percent, an unusually high percentage for the first year of service of a powerplant; Gentilly-2, in Quebec, Canada, reached 78.5 percent; Wolsung, in the Republic of Korea, reached 71 percent; and Embalse reached 68.5 percent. (The lower figure for Embalse reflects a lesser demand on the system. The powerplant's availability was excellent.)

In terms of availability (the Embalse powerplant's "capacity" for providing 100 percent of its power without regard for the limits on the system), the output of the Embalse powerplant during the first part of this year was: January, 90 percent; February, 69 percent; March, 95 percent; April, 97 percent.

Ontario Hydro is continuing its extensive program for the operation and construction of Candu nuclear powerplants. The No 6 unit of the Pickering powerplant, comprised of eight units, was started up during October 1983, and went into service officially in February of this year. Since then, it has been operating at almost full power. The other two Pickering units will begin operating in August 1984 and April 1985, respectively. The opening of the Nos 5 and 6 units of the Bruce powerplant, consisting of eight units, is scheduled for June and September of this year, and the other two units will start operating in 1985 and 1986, respectively.

Also progressing is the work on Ontario Hydro's Darlington powerplant, which will consist of four units each with 850 MW, the largest units in the family to date. Plans call for completing these units between 1987 and 1992.

Work is also continuing on the Candu five-unit powerplant in Cernavoda, Romania; the pace of the work is increasing from month to month. The framework has already been finished on the reactor buildings for the first two units, and the concrete slab for the third unit has been installed. The service building and the auxiliary buildings of the powerplant are likewise under construction. An intensive program is being implemented for engineering, as the construction activity on the site heightens and the purchasing negotiations increase.

Atomic Energy of Canada Limited is supplying engineering design services for the Cernavoda project. Since Romania intends to undertake the execution of an extensive program, it will acquire the rights to use the Candu design and the designs for the equipment supplied from Canada, so that the future projects may be constructed with increased local participation.

There are currently 20 reactors of that make in operation, with a total capacity exceeding 10,000 MW and 18 additional units under construction, with a total capacity of 12,000 MW.

The search is continuing for markets for the reactor. A study is being made of the feasibility of building a second unit at Point Lepreau, in New Brunswick, devoted basically to supplying electricity to the United States. In the international area, the negotiations with Turkey are well under way for the supply of a 600 MW unit. There is a constant interest in Korea in a second unit for Wolsung; and interest that appears to have been fostered by the timely completion of the first unit and its excellent performance since it went into service.

The system is still a long-term nuclear option that is attractive to many countries. There are three main reasons for this. In the first place, its proven output; secondly, its noteworthy ease for replacing key parts of the reactor core, thereby extending the unit's economic life; and, thirdly, the flexibility of the fuel cycle.

In addition to the design engineering for the reactors, AECL renders a wide range of permanent services to the public service companies which have units in operation, in order to maintain the high degree of availability and constant good operation of the powerplants. The advantages of such services include: the reduction in shutdown time, the maximizing of power availability, the effective introduction of technological improvements and the decrease in the need for specialized personnel working fulltime, thus also reducing the need for having sophisticated equipment.

During the past 2 years, the world economic conditions and inability of many countries to use large amounts of additional energy have led to conceptual studies for achieving a new, smaller member of the Candu family: a 300 Mw generating powerplant. The purpose was to assess the possibility of designing a reactor that would offer advantageous conditions with respect to construction costs and time, and, at the same time, would use the systems, components and concepts already proven. With a construction timetable of 48 months and a cost per unit of energy close to that of the present 600 Mw powerplants, the 300 reactor has several attractive features:

It requires less investment in capital costs.

It meets the requirements of countries with low rates of growth in electricity or isolated areas of countries whose electrical distribution systems are not large enough to absorb the production from larger units.

It requires less construction time, which therefore means lower interest costs.

In Argentina, AECL is currently finishing minor work on the Embalse project; the powerplant has been operated entirely by the National Commission for Atomic Energy since its provisional acceptance date, which was 20 January 1984, and its entry into full commercial operation. The high degree of participation by the Argentine nuclear, industrial and engineering sectors was one of the leading features of the project.

"Last year, five Candu type nuclear powerplants for generating electricity attained production at full power; one of them, with 600 Mw, was the Embalse Rio Tercero powerplant, in Cordoba Province." This statement was made by one of the board members of the producing firm's local agency, who added: "They have continued to maintain the excellent output achieved by the older reactors of the same make, clearly proving that those of Canadian design, which use natural uranium as fuel and heavy water as a moderator and coolant, surpass all the other reactor systems." He also noted that Ontario Hydro is continuing its extensive program for operation and construction of Candu nuclear powerplants. For example, the No 6 unit of the Pickering powerplant went into service last February, with two units still remaining, which will start operating this year and next. Also scheduled is the start-up of the Nos 5 and 6 units of the Bruce powerplant. In addition, work is continuing on the five-unit powerplant in Cernavoda, Romania, where Atomic Energy of Canada is providing engineering services for the project. There are currently 18 Candu reactors in operation, and 18 more units under construction. At the same time, negotiations are under way with Turkey for the supply of one of them, and there is a constant interest in Korea in a second unit for Wolsung. The informant adds that the system is still an attractive long-term nuclear option for many countries, owing to its output, its ease for replacing key parts and the flexibility of its fuel cycle.

Besides the design engineering for the reactors, AECL is rendering an extensive range of permanent services to the companies that have Candu units in operation. At present, it is also planning a 300 Mw generating plant that will represent less investment, less construction time and satisfaction of the needs of countries with low rates of growth in electricity, or isolated areas whose electrical distribution systems are not large enough to absorb the production from larger units. He remarked in conclusion: "In our country, AECL is currently finishing minor work on Embalse. The powerplant has been operated entirely by the National Commission for Atomic Energy since the date of its provisional acceptance, 20 January of this year."

"The Ansaldo group of companies is in the best position to cooperate in the Argentine plans for using their electrical equipment to replace oil, such as the nuclear powerplants," according to a statement made by the company's directors. In view of the increase in the national industry's share of the sector, that cooperation could take place expressly through the transfer of technology and the provision of parts and components the manufacture of which cannot be carried out in the country yet. They observed: "This position is

backed by the records of the company in the execution of Cirene, Cernavoda, Caorso, Montalto, Superphenix and Pec, where the group acted in the capacity of a 'main contractor,' holding responsibility for the implementation of the projects and the devising of the engineering, the design, the coordination and supervision of the work and the supply of pressure tanks, steam generators, pressurizers and turbogenerators, to which must be added supplies of various types provided for nuclear powerplants outside Italy. In our country, the turbogenerator for the Embalse nuclear powerplant, the machine with the largest amount of power in Latin America, indicates the importance of the company's presence; which, added to the 1,200 MWe installed by the group in conventional, thermal and hydraulic powerplants, has brought about a 15 percent participation in the energy equipment currently available. This presence has also become consolidated through Ansaldo Argentina, S.A., a local company set up as another demonstration of the group's confidence in the country's future." They added: "For this purpose, it has formed a large group of Argentine technicians and engineers of proven experience, trained for the development of highly specialized engineering, management, supervision and coordination of projects and provision of supplies and services of various kinds. These activities have had a considerable application, through a major participation in the execution of the Comandante Luis Piedrabuena thermal powerplant, with two 310 MW units, in Bahia Blanca." They concluded by saying: "The group's experience has been placed in the service of the country, with a view toward consolidation of the bases already established and a fostering of the opportunities for exporting non-traditional products with highly specialized technology and a large amount of value added."

The native electromechanical industry has participated actively in the provision of components for the nuclear plan. Tenas, S.A., is regarded as the leading company in the country, having supplied motors for auxiliary facilities on the nuclear island of the Embalse powerplant. These are motors for the stop cooling pumps and the moderator pumps, critical components for the powerplant's operation and safety. To do this, the company had to implement a program to guarantee level I quality, based on the standards of the Canadian Standards Association. The program requires quality controls and inspections during all production stages, covering contractual aspects involving provision of design materials, documentation, manufacture, inspection and testing. The motors were taken to Austria to be tested in the pump supplier's test "loop", with results that were considered satisfactory. At present, they are in operation at the powerplant. In the conventional area of the Embalse project, it has also supplied motors and medium voltage generators for auxiliary turbogenerator systems and for the emergency diesel plant. Also provided have been motors and generators for the heavy water pilot plant and for the fuel enrichment plant. Tenas is currently being preerated by top-line companies as a supplier of rotating electrical machines for nuclear powerplants, and recently participated in a feasibility study on the fourth Argentina nuclear powerplant conducted by the National Commission for Atomic Energy.

One of its directors commented: "Since its beginnings, Zoloda, S.A., has undergone constant expansion, with a growth that has followed that of the market which it serves. Throughout the past 26 years, new manufacturing

designs, materials and techniques have been incorporated for the products of its original line; which, in turn, created the conditions for the manufacture of other new ones, heightening their complexity and quality." He added that the provisions of the nuclear plan requiring supplies of native manufacture for the projects caused the technology to move from the experimental phase to the industrial level. For this purpose, Zoloda was qualified by CNEA, Atomic Energy of Canada and, more recently, by ENACE, to take part in various projects, ranking among the leading companies which have implemented the required controls and procedures for inspection and manufacture.

The Argentine Association of Nuclear Technology

"The Argentine Association of Nuclear Technology [AATN] has been in existence for 12 years now, and it is constantly growing," remarks its chairman, Dr Jaime Pahissa Campa. The non-profit entity contains within it members of the National Commission for Atomic Energy and individuals from several of the country's universities, companies in the sector and independent professionals. In addition there are affiliated firms which have found through the association the means of exchanging information on the subject. Hence, it is (he adds) an institution that fully represents the nuclear field, because it covers the whole spectrum of its activity, and more than a chamber, because the latter pursues material goals; whereas the association, on the other hand, goes beyond at, with complete treatment of the nuclear policy and its projections inside and outside Argentina.

The question was asked of him: Since December the nuclear issue has gained extensive space in the country, evoking controversies that did not exist before. Is this a fact in the association's view?

The head of the entity remarked that it was so, but explained that the National Commission for Atomic Energy has always acted with an open-door policy and that, at the beginning, owing to its small size, this fact could not be completely publicized. Hence, for example, the fact that, in 1955, out of approximately 10 radioisotopes discovered throughout the world, four finds were made in Argentina did not have any major repercussions. He noted that, in that year also, at the first Geneva conference on the subject, we presented 40 reports on a high international level, something that did not receive much publicity either. So, CNEA's activity was not too well known, even in the professional area itself. "Another example: Also in 1955, Argentina learned that Brazil had acquired a reactor, from an American firm, I believe. It was then decided to make a reactor in the country, which was to be opened day before that of the neighboring nation. A feverish activity began, and a study was made on which of the existing small reactors was the most adaptable to our environment. A German model was selected, people were ordered to become familiar with it; and, when it was discovered to be too complicated for our potential, it was simplified, with the participation of Argentine companies in the nuclear field for the first time. It was opened in 1958, a week before Brazil opened its own. This represented a change in the configuration of the field in the national area, and so we proceeded to create the Atucha system, with its first power reactor in Latin America; and a plan was established

which, if it continues, will enable us to start up a reactor manufactured with 80 percent Argentine participation in 1990. So, day by day, the effort in the nuclear field has acquired more notoriety, becoming "news," and as a result, it is currently evoking controversy through its widespread publicity in the press.

He was asked: Is there a national nuclear industry?

"Actually, there is: In 1958 our industry's first timid invasions into the sector took place. It has also participated in Atucha, despite the fact that the "turn-key" aspect, especially in the civil construction area, was purchased. So, it has been increasing its collaboration, and in the execution of Embalse it is estimated that this participation will be 56 percent; with the important factor that it will consist of more specific components. The native industry is gaining strength and becoming intensified to comply with the country's decision to meet its energy needs with the construction of four nuclear powerplants by the end of the century."

He was asked: "In the association's view, if the plan in the area were to be delayed, how would it affect the industry?"

"The nation is confronting major economic difficulties and there are almost no funds for anything. At the same time, 'de-industrialization' requires less energy demand. If both factors are combined, it would appear logical to think that the solution would consist of holding back the nuclear plan and waiting for a more favorable time. Nevertheless, this would be a very serious mistake, because it would discredit all the effort expended by the industry and the country itself to reach the present high level. It should not be forgotten that the nuclear plan is a harmonious combination of the assessment of the energy needs and the capacity to produce the energy for them. A delay in the start-up of a project also causes a dangerous loss of profits. Hence, it should be realized that the country's energy demand by the end of the century, even based on conservative estimates, will necessitate stressing the construction of nuclear powerplants, and that it should not reach the point of dependence of having to purchase them on a 'turn-key' basis. Hence the plans must be carried out: Argentina can, at the same time, become a leading exporter of technology, with a high degree of value added, which will put it in a preeminent position, at least in the regional area."

2909

CSO: 5100/2113

FINANCIAL LOSSES FROM ANGRA I TOTAL \$500 MILLION

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 6 Jun 84 p 23

[Text] A defect in the charging pump for the cooling system of the Angra-I reactor forced FURNAS [expansion unknown] to suspend tests for the start of the plant's commercial operation for at least 40 days. This means that financial losses in the form of interest on foreign financing exceeded \$500 million, not counting the loss of equipment lifetime which comes to more than 5 years at the Almirante Alvaro Alberto power station; the equipment had been designed for 30 years of commercial operation and, like any mechanical equipment, was subjected to waste because it was not being used normally.

FURNAS technicians admitted also that there was another planning error, in addition to the trouble with the steam generators, which required another change in the plant's operating timetable. That defect, unknown even to nuclear engineers, was reported by Westinghouse to FURNAS with a request that some parts of the reactor, called heat pipe joints, be exchanged.

These heat pipe joints are the parts that cover the cooling system's connections to prevent a thermal shock--during the exchange of heat from borated water with the pipes--from damaging the welding which would create the danger of leaks. Other Westinghouse reactors in the United States reveal that same defect, thus forcing the American company to exchange all of the thermal pipe joints in the other, similar reactors, including the Angra-I reactor.

FURNAS manager Luiz Cals said yesterday that the price for each nuclear kilowatt generated at Angra-I is \$3,000.00; this results in a total operating cost of more than \$1.8 billion for the plant (626,000 kilowatts). As FURNAS President Licinio Seabra admitted, closing the plant down for a year amounted to an increase of 10 percent in interest alone or \$180 million for the foreign financing costs and the successive delays have already added up to more than 3 years; the loss of \$500 million is a conservative estimate and does not include the profits that were not earned.

Luiz Cals said that the defect in the cooling system's charge pump caused a minor leak of radioactive water containing boron which is used as a moderator in the fission process. An engineer is scheduled to arrive from Westinghouse in order to open the pump and take it to the United States [as published]; it is to be returned after 3 weeks. After repair, it will take more than 20 days to install the pump in the plant again.

The FURNAS manager thinks that, after the correction of this problem and if no new defects arise during the commissioning tests, when the plant's power will be increased gradually, following more than 2 months of work, the plant should be able to become commercially operational, at which time it will have a 1-year guarantee from Westinghouse.

For Luiz Cals, relations between FURNAS and Westinghouse continue to be very good; there will be no claims from the American company because of delays in the payment of the bills that were due. This matter will be forwarded to the financial directorate of FURNAS. Luiz Cals said that he had not noted any discontent among United States engineers. He also noted that FURNAS is not seeking any compensation for the losses caused by errors in the Westinghouse project.

5058

CSO: 5100/2109

INSUFFICIENT FUNDING THREATENS NUCLEAR PROGRAM

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 21 Jun 84 p 27

[Text] The Brazilian Nuclear Program runs a serious risk of paralysis if NUCLEBRAS [Brazilian Nuclear Corporations, Inc] does not obtain an additional 200 billion cruzeiros in new funding for its budget. The revelation came yesterday in Rio from NUCLEBRAS president Dario Gomes, who noted that at this time the nuclear program is only meeting minimum goals.

According to the NUCLEBRAS president, the Secretariat of Planning [SEPLAN] of the Presidency of the Republic should grant the requested allocation, supplementing the annual budget of 1.74 trillion cruzeiros, because SEPLAN had been working with a projected inflation rate of 75 percent and an average quotation of 1,380 cruzeiros to the dollar, which have already been revised for the budgets of other state companies to 150 percent inflation and a dollar valued at 1,686 cruzeiros.

Dario Gomes admitted that the resources from foreign loans, in the amount of \$330 million in the current year, will go to pay the NUCLEBRAS debt service and amortizations.

Gomes said that the average lag in the nuclear program is already 10 years, but that the equipment for the Angra 2 and Angra 3 plants is being stored in Itaguaí, in the NUCLEP [NUCLEBRAS Heavy Equipment, Inc] plant, with all the necessary precautions to prevent deterioration and to maintain the required security. Gomes feels that as long as they are adequately protected, the useful life of the materials will not be shortened.

The NUCLEBRAS president also admitted that there was an exodus of technicians, engineers and even operators trained in the FRC for the nuclear program, because of a lack of professional incentives and the salary cuts. To handle these problems, he said that NUCLEBRAS was one of the first state companies to adjust the salaries of its personnel above the limits imposed by Decree Law 2,065, and was rehiring 40 engineers in the KKW (Kraftwerk Union)--in the FRC--so they would not lose their professional skills.

He reiterated that the nuclear program had contracted a debt of \$2.3 billion in loans and another \$1.7 billion in trade agreements signed with the FRC for the acquisition of equipment for Angra 2 and Angra 3, and for the enrichment and reprocessing plants. In all, the nuclear program should cost \$18.6 billion

counting only the direct costs of the eight nuclear plants. The orders for the next plants--Iguape 1 and Iguape 2--should be the responsibility of the government which succeeds that of Figueiredo. They should cost about \$4.68 billion, or \$1,28 per nuclear kilowatt for these 1,300-megawatt plants.

He added that the technical problems with the enrichment plant, such as the manufacture of high-power compressors for the industrial plant, have already been overcome.

6362

CSO: 5100/2114

BRIEFS

ERG CONSORTIUM LOAN--Today in Frankfurt, a consortium of ERG banks led by Kommerzbank will sign a \$90 million loan agreement with NUCLEBRAS [Brazilian Nuclear Corporations, Inc], represented by NUCLEBRAS president Dario Gomes and Wenceslau Magalhaes, its financial director. This loan will be added to another loan of \$80 million, signed a few days ago in London, by a consortium of English banks led by EUROBRAS (European Brazilian Bank). The two loans constitute phases one and two of the Brazilian foreign debt renegotiation and are guaranteed by the National Treasury. Also in the ERG, the two NUCLEBRAS officials will meet with the Dresdner Bank to conduct further loan negotiations, to round out the foreign credit needed by NUCLEBRAS in 1984. [Text] [Rio de Janeiro O GLOBO in Portuguese 4 Jun 84 p 13] 6362

DIRECTOR'S RESIGNATION--Rio--John Albuquerque Forman, director of NUCLEBRAS [Brazilian Nuclear Corporations, Inc], has submitted his resignation, claiming personal reasons. He has been with the company since its creation in 1975, and intended to leave in February 1984, when Dario Gomes replaced NUCLEBRAS president Paulo Nogueira Batista. At the request of the new president, Forman agreed to stay on as director for 3 more years. He will remain with the corporation until June, awaiting the presidential decree accepting his resignation and naming his successor. According to an advisor, Forman feels he has already achieved his mission in NUCLEBRAS, bringing the uranium reserves up to 301,490 tons. Despite criticisms of the nuclear program, he has always aligned himself with the government policy in the sector. After the nuclear program began to present successive delays, culminating this year in a major deceleration for want of funding, several officials left the corporation. Some of them went over to private industry, where the salaries are higher. In September, Carlos Tadeu, the financial director, returned to the Central Bank; he was replaced by his assistant, Wenceslau Magalhaes. With the deactivation of the nuclear plants, Emilio Leme, superintendent of NUCON [NUCLEBRAS Nuclear Plant Construction, Inc], who was always guaranteed to meet expenses and schedules, also thought it better to get out, leaving Jarbas Novaes, of the directorate of Furnas Centrais Eletricas, in his place. [Text] [Sao Paulo FOLHA DE SAO PAULO in Portuguese 12 May 84 p 11] 6362

FRG ENVOY VISITS PLANTS--FRG ambassador to Brazil Walter Gorenflös [as published] visited the industrial installations of NUCLEBRAS [Brazilian Nuclear Corporation, Inc.], that is, the Angra-II plant, in the township of Angra dos Reis (Rio de Janeiro), the fuel element factory, and a uranium isotope enrichment plant, both in the township of Resende (Rio de Janeiro); He said that "The technology transferred from Germany is contributing substantially to the creation of an independent nuclear industry here. I believe that the decision to develop a capability for the peaceful use of nuclear energy will continue to be timely and suitable for a country of the size and importance of Brazil. The FRG will continue to give Brazil full support in line with our agreements now in force." Ambassador Gorenflös believes that "The CNEN (National Nuclear Energy Commission), in setting up safety requirements for the Angra II and III plants, is being guided by the German plant at Grafenheinfeld which last year produced a world record of 10 billion kilowatts." NUCLEBRAS President Dario Gomes in turn announced that he would sign a loan contract worth \$90 million with a consortium of German banks, headed by Kommerzbank in Frankfurt on Monday. [Text] [Sao Paulo O ESTADO DE SAO PAULO In Portuguese 2 Jun 84 p 22] 5058

ENRICHED URANIUM TO BE PRODUCED--Dario Gomez, president of Nuclebras [Brazilian Nuclear Corporations], in Rio de Janeiro, today, announced that within 3 years Brazil will start producing enriched uranium. Gomez pointed out that the first real and practical achievements in this field were obtained with FRG cooperation and pointed out that by the end of the year the FRG will transfer to Brazil the know-how regarding one of the three states that are followed to enrich uranium and the compressors that are necessary for this process. Recently Gomez obtained loans for a total of \$170 million with the FRG and Great Britain covering the foreign debt and amortizations. [Excerpts] [PY210126 Brasilia Domestic Service in Portuguese 2200 GMT 20 Jun 84]

CSO: 5100/2112

NOVEL PROCESS OF PRODUCING POWER DISCUSSED

Haifa INNOVATION in English No 103 Jun 84 p 2

[Text]

**NONPROLIFERATING NUCLEAR POWER
TO BE BASED ON THORIUM**

Tel Aviv – A novel process for the production of useful power from atomic fission has been devised by a team of researchers, headed by Prof. Alvin Radkowsky, now of Tel Aviv University's Department of Nuclear Engineering. In Israel since 1972, Prof. Radkowsky formerly headed the U.S. Atomic Energy Commission's Office of Naval Reactors and directed advanced research projects for U.S. and international agencies.

The new development, based on thorium, aims at the solution of two troublesome problems: scarcity and proliferation. First of all, uranium – the universal source of fissionable material for nuclear reactors – is a not very common mineral, found in only relatively few major deposits. Thorium, on the other hand, is much more plentiful; although it is not radioactive in itself, Prof. Radkowsky and his associates have found a way of using it in nuclear reactors in conjunction with much smaller quantities of conventional fissionable material than were previously needed. The available uranium thus can be "stretched", to cover the world's energy requirements over a much longer period.

The second problem posed by fission technologies now in use is that of "proliferation": more radioactive waste is produced by conventional nuclear reactors, than the fuel supplied to them; some systems even breed more fissionable material than they consume. This causes serious problems of public safety – no truly satisfactory system of

radioactive waste disposal has been devised, as yet — and also raises the specter of thermonuclear weapon proliferation. The latter could also result from the unlawful, but difficult to prevent diversion of fissionable materials, ostensibly stockpiled for use in civilian reactors.

Radkowsky's new design meets these problems head on. Since it will require much less fissionable fuel than conventional plants, it will allow a sharp reduction in the quantities of uranium or plutonium stored in different parts of the world; since it does not produce more radioactive material than is put into it, it also reduces the difficulties of waste disposal.

After the conclusion of basic work on this new invention, the team headed by Prof. Radkowsky has now begun the design of a thorium light water reactor. Plans are expected to be completed within two years, and the new system could generate power within a decade.

Funding for the development and design of this reactor is provided by Israel government agencies and by New Power Technology, a New York based company. Several nuclear scientists of world renown serve on the company's Board of Directors, including Edward Teller, Hans Bethe, Eugene Wigner and Herbert Goldstein.

CSO: 5100/4507

CHASMA PROJECT: SOVIET COOPERATION THOUGHT POSSIBLE

GF231012 Lahore NAWA-E WAQT in Urdu 18 Jun 84 p 3

[Editorial: "The Chasma Nuclear Project--the U.S. Negative Interest!"]

[Excerpts] The federal minister for planning and development, Dr Mahbubul Haq, has said that no serious reply has been received for the international tenders which were offered 3 years ago. He was speaking at a press conference on the 6th development plan. While he was elaborating on the second year of the plan which commences on 1 July, he was asked a question about the allocation of 49 crores of rupees for the Chashma nuclear project under the new federal budget.

This statement by Dr Mahbubul Haq is more of an official declaration than a revelation, because the indifference of the Western countries to this important Pakistani project as a result of U.S. pressure is no secret. The only difference is that what was mentioned in an undertone at home or what was mentioned as speculation or information has now been spelled out in definite terms by Dr Mahbubul Haq for the first time. Although he has expressed the hope that the international community will cooperate with Pakistan on this important project which could provide the cheapest source of energy, his hope can only be deemed a noble desire, because the United States, which is considered Pakistan's ally and friend, has displayed a very negative interest in this matter with undesirable repercussions; and this policy continues. Despite its statement that Pakistan's freedom and security are an important pillar of its foreign policy, U.S. "blessings" are the reason that France reneged on its bilateral agreement to provide Pakistan with a reprocessing plant and that none of the Western countries is willing to display some positive interest in this important Pakistani project.

The innuendos dropped from time to time by the Zionist-influenced mass media regarding Pakistan's nuclear program also contain the fabrication that the PRC has provided nuclear technology to Pakistan or that Pakistan has exploded a nuclear device with PRC cooperation in China's Xinjiang Province, although Pakistan and the PRC have repeatedly refuted such misleading reports. The Zionist elements and Western media have adopted a policy of spreading rumors and then demanding clarifications from Pakistan and the PRC. Although this policy of the Western countries and the United States dates back to the traditional hostility of the Western prejudice against the Mus-

lims, it is extremely narrow-minded and opportunistic. For more than 25 years these countries had been opposing the construction of an iron and steel mill in Pakistan. But now the complex has been set up with Soviet cooperation. During Finance Minister Mr Ghulam Ishaq Khan's visit to Moscow, the Soviet Union expressed interest in various projects including the thermal power plant in Multan, the Kalabagh dam and the Chashma nuclear project. If the Western countries continue in their indifferent attitude due to U.S. pressure, Pakistan will be forced to seek Soviet cooperation. Whatever the results or repercussions, they will enhance Soviet influence and not that of the United States, which professes to be Pakistan's friend and ally and which allegedly considers Pakistan's freedom and security a cornerstone of its policy.

By entering the sphere of Soviet influence will Pakistan be able to avoid becoming another Afghanistan or not? This is an important question, but if the United States continues its policy of opposition for the sake of opposition and its present negative interest, this will ultimately be shortsighted on the part of the Western countries and the United States. The United States is a huge country, a superpower, but it has entrusted all its decisions and authority regarding its relations and ties with the Muslim world to the Zionist lobby and the State of Israel, which is no bigger than a mango seed and this in itself is an enigma, a tragedy as to why such a great country has reduced itself to such pettiness in this matter.

BRIEFS

CHINESE AID DENIED--A Pakistani Embassy spokesman in London has strongly rejected the allegations in connection with Pakistan's nuclear program and that China is assisting Pakistan in the nuclear field. The Pakistani Government has repeatedly clarified the fact that its nuclear program is completely for peaceful purposes and is aimed at meeting the increasing energy needs for development and the welfare of people. The spokesman said that Pakistan has no plan to manufacture nuclear weapons. The spokesman rejected the reports that Pakistan is preparing nuclear fuel of the grade used for the production of nuclear weapons. The spokesman said that so far experts of the International Atomic Energy Agency have inspected 48 times the sole nuclear plant of Pakistan in Karachi. [Text] [BK231006 Karachi Domestic Service in Urdu 0200 GMT 23 Jun 84]

CSO: 5100/4733

BRIEFS

NUCLEAR POWER PLANT--On the economic front Bongo has also manoeuvred the French into a corner. For the past year he has been insisting that France sell Gabon a nuclear power plant. A French technical mission from the state-controlled company, SOFRATOME, some time ago prepared a report in which it argued against the project, saying it was too costly and that the country's hydroelectric capacity was more than sufficient to meet the country's energy needs for the next century. But Bongo won. The Elysee has now approved the sale of a minipower plant, costing about \$400m, capable of generating 300 megawatts. Local potentates should do well out of the contract. Another French concession was the agreement to boost its purchase of Gabonese manganese, to the detriment of acquisitions from South Africa. Paris has been reluctant to commit itself on this for fear of being overly dependent on one source. [Excerpt] [London AFRICA CONFIDENTIAL in English Vol 25 No 8, 11 Apr 84 p 7]

CSO: 5100/44

SWAPO THREATENS UK WITH URANIUM CLAIM

Windhoek THE WINDHOEK ADVERTISER in English 12 Jun 84 p 1

[Text]

LONDON: SWAPO IS THREATENING Britain with an international lawsuit claiming more than R1-billion for uranium Britain has bought from the Rössing mine.

It said in a statement issued in London a Swapo Public Relations Director, Mr Clive Algar, were in Britain's Central Windhoek to comment to Electricity Generating Board - which buys uranium from Rössing for its nuclear power stations - liable for compensation claims under a United Nations decree covering the protection of the Namibia's natural resources.

"The true costs of uranium from Namibia should, therefore, have reflected a provision for compensation, a demand which will be made with the full authority of international law," it said.

Neither the Managing Director of Rössing, Mr Colin Macaulay, nor its Public Relations Director, Mr Clive Algar, were in Central Windhoek to comment to the Campaign against the Namibian Uranium Contract (CANUC), which supports Swapo, said the claim could amount to more than 700 million pounds or about R1 260m.

Britain's uranium supply contract with Rössing will not be renewed when it expires at the end of this year.

The country has decided to cut its stockpile by 50 percent and diversify its supply sources.

Swapo and CANUC

maintain, however, at present half of the country's supply comes from Namibia, and compensation could be claimed on the basis of uranium already purchased.

CANUC said it was seeking from British authorities an undertaking that no new contracts would be sought with Rössing until the Territory was independent in terms acceptable to the United Nations, and it maintained so far the British had been "strangely silent" about future intentions.

It is also demanding the current contract be terminated before the end of the year.

Britain does not disclose details of its uranium supplies, or the size of its stockpile.

Earlier this year an representative of CANUC, Mr Alun Roberts, was detained for more than two

weeks by Security Police in Namibia and then deported after after Police said they found "documents" in his possession.

KOEBERG REACHES FULL CAPACITY

Johannesburg THE CITIZEN in English 20 Jun 84 p 15

[Text]

CAPE TOWN. —Unit one at the Koeberg power station increased its production to a nominal 100 per cent for the first time at noon yesterday, after having received permission from the Atomic Energy Corporation (AEC) to do so, a spokesman for Escom said in Cape Town yesterday.

The spokesman said in a statement this was part of the test programme preceding full commercial operation. This level would not be maintained continuously at first, but

would vary, depending on the tests being conducted.

Permission to take the unit to full capacity is the final stage of a long series of tests which have to be completed before full commercial operation, which will probably take place in a few weeks time.

Escom said fuel loading on the first unit at Koeberg started on October 29, 1983 and this was followed by criticality on March 14, 1984.

Since then, tests have

been conducted at increasing levels of output, the last of which was 90 percent on June 2.

Each step of the process has been closely monitored by the AEC which has to licence any change in the status of the plant.

The second unit at Koeberg is at present undergoing hot functional tests. During these tests, the unit is subjected to high temperatures and pressure to ensure that all systems function correctly before fuel is loaded into the reactor.

It is expected the second unit will come into commercial operation before the winter of 1985, the spokesman added. — Sapa.

CSO: 5100/45

MINISTER COMMENTS ON WASTE ISSUE IN PROPOSED LEGISLATION

Helsinki HELSINGIN SANOMAT in Finnish 17 May 84 p 29

[Article by Renny Jokelin: "Minister of Trade and Industry Lindblom: Preparations for Nuclear Energy Law Bugged Down in Waste Funds"]

[Text] The bill--which has been under preparation a long time in the government--for a new nuclear energy law has bogged down in the question of who possesses the funds which are reserved for the treatment of nuclear wastes.

According to Minister of Trade and Industry Seppo Lindblom the ministry work group debating the issue has "devised numerous alternatives," but unanimity has not been reached. However, the other big and key questions have been solved, according to Lindblom.

Lindblom said on Wednesday that the ministry work group will try to conclude its work during May and introduce the matter "in the summertime" for the entire government to decide. The nuclear energy law should get to the Parliament next autumn.

The Bank of Finland or other financial institutions were previously planned as the site of the waste treatment funds. The power companies have insisted on keeping the funds on the companies' accounts as guarantees. Two to three billion marks may flow into the waste funds during the next few years. After treatment and final placement of the wastes will be paid with them.

Enactment of the nuclear energy law is considered a precondition for a decision on the new large power plant. Lindblom stated on Wednesday that a decision on the power plant does not need to be made for at least a year or two. On Wednesday Lindblom presented the Ministry of Trade and Industry's newest clarification of electricity consumption estimates up to the year 2000.

According to Lindblom the report does not take a stand on behalf of a nuclear power plant or a coal power plant, although it does note that nuclear power is the economically most advantageous alternative in electricity production.

The report states that by the turn of the millennium an additional electricity production capacity of 1,300 megawatts will be needed in Finland.

Commission stressed, however, that "questions of environmental policy" are very essential in decisions on a large power plant. Their significance is still not discussed in the newest clarification, but the Ministry of Trade and Industry intends to push for additional research on "joint production of heat and electricity" and on the actual energy requirement of the forest industry, among other things.

In the report the price of the new nuclear power plant is put at about eight billion marks and that of the coal power plant at just under five billion. The operating costs of a coal power plant are considerably greater. According to the clarification of a peat power plant is out of the running in decisions on a large power plant.

12327

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QUICK DECISION URGED ON BUILDING NEW NUCLEAR PLANT

Helsinki HELSINGIN SANOMAT in Finnish 26 May 84 p 29

[Unsigned article: "Electricity Service Advisory Board in Its New Assessment: Decision on Nuclear Power Does Not Tolerate Long Postponement"]

[Text] The decision to construct a nuclear power plant cannot be postponed for long, according to the basic schematic plan for electricity service just prepared by the electricity service advisory board. Postponement would mean substantial extra costs and a rise in the price of electricity.

According to the basic schematic plan, which is renewed yearly, it would be most economic to take the nuclear power plant into use as early as 1990-1991.

A particularized nuclear construction program is not set forth in the basic schematic plan, because the government already decided last year not to take an official stand for or against nuclear power. On the electricity service advisory board there was also disagreement about construction tempo as an indication of which, three divergent opinions are attached to the memorandum. Two of these are from the Ministry of Trade and Industry's energy department, which just submitted its energy estimates, and one is from the Ministry of Finance.

In the opinion of the majority on the electricity service advisory board, the electricity service has to create the conditions for the desired development of the national economy, nor can bottlenecks arise from the electricity supply.

The advisory board has estimated that the demand for electricity will increase up to the year 1993 in a continuous period roughly three percent a year. According to the most recent calculations of the energy department, the need should grow 1.5-2.5 percent a year.

If the energy requirement increases three percent, the conditions are created for economic growth of 2-3 percent, according to the advisory board. The KTM [Ministry of Trade and Industry] forecasts economic growth of 2.5 percent yearly at its height.

The power plant schemes suggested for construction and the power plants designed for completion by 1993 are indeed quantitatively sufficient according to the advisory board, but they will not economically cover the electricity need up to 1992.

In addition the advisory board estimates that the import of electricity from the Soviet Union will continue at its current magnitude in the 1990's, too. The present term of agreement ends before the start of the 1990's.

In his dissenting opinion, Erkki Eskola, chief inspector of the energy department of the Ministry of Trade, considers the estimate for electricity demand too large. According to him, the estimate of the forest industry's demand for electricity is twofold compared with the growth of the last decade. In addition the advisory board's estimate is based, according to him, on the highest possible alternative of electrical heating. According to Eskola, the nuclear power alternative means by itself an accelerated demand for electricity.

The choice of the nuclear power alternative would presuppose additional clarifications, according to Eskola. Among other things, realistic development estimates of its electricity requirement should be obtained from the forest industry. In his dissenting opinion he also asks for a clarification of the social effects of large power plant alternatives.

Funds for Nuclear Waste Treatment

The external fund of the power companies is the most likely solution in the financing of nuclear waste treatment. A five-minister committee on economic policy is, as far as one knows, arriving at this standpoint with the Social Democrats and the SMP [Finnish Rural Party] in the vanguard.

Waste treatment and its financing are linked to the future nuclear energy law. The ministerial committee was supposed to clarify the waste-financing question as early as this week, but the timetable is now postponed to June.

Belonging to the group are ministers Seppo Lindblom of the Social Democrats, Christoffer Taxell of the Swedish People's Party, Toivo Vajjarvi of the Central Party, Pekka Vennamo of the Rural Party and Social Democrat Matti Ahde.

According to Yrjo Sahrakorpi, government secretary of the Ministry of Trade and Industry, the fund is the obvious solution, although preparations are still incomplete.

Thus the committee's original proposal for the power companies' internal guarantee of nuclear waste is bypassed, a guarantee which the companies would have ended up making annually. Among the ministers the only supporter of the guarantee was Taxell.

Toellisuuden Voima [Industry's Power], which at one time issued a statement about the report, strongly supported the guarantee model and opposed outside

funding, because it had doubts about the preservation of monetary value in this model.

The Social Democrats do not consider the guarantee a sufficiently sturdy solution, taking into account the great social significance of the nuclear waste question.

In the system outlined by the ministers it would, however, be an advantage to the power companies that the companies would be able to borrow part of the funds back for their use.

According to Sahrakorpi, it is planned, among other things, that the power companies receive at most 30 percent of the funds; the state could borrow the rest for environment inspections, for example, or the state companies for investments.

On the other hand, the central question about the administration of the fund, i.e., who has authority over the fund, is still unresolved, and additional time for deliberation is needed.

The companies would end up adding to the fund yearly in relation to the amount of energy produced. Total capital might be a good three billion marks, which would increase in accordance with the plants' technical time of use. The technical time of use is about 25 years. The method of payment would be such that funds would be collected more quickly in the beginning than in the final stage.

Sahrakorpi calculates that if a new nuclear power plant were established, then an attempt should be made to collect the waste treatment funds within 20 years of the startup of the plant.

The Center Party's suggestion for a nuclear waste tax collected by the state did not receive support from the others; nor was there support for a joint state and industry insurance company presented by industry.

With the nuclear waste fund the power companies are supposed to cover the storage of nuclear wastes and the costs of the shutdown of power plants.

12327

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NEW PROCESSING METHOD BINDS TOGETHER SPENT FUEL

Helsinki HUFVUDSTADSBLADET in Swedish 14 May 84 p 3

[Article by Tora Mettheiszen: "Experiment on Hastholmen: New Purification Method Binds Spent Fuel Together"]

[Text] Lovisa (HUFVUDSTADSBLADET)--Imatran Voima, in consultation with Helsinki University, has developed a new method of purifying the vaporization waste that constitutes a part of the so-called power plant waste on Hastholmen in Lovisa.

The experiment has been conducted at the nuclear power plant for several weeks, and the results have been good.

The whole idea of the experiment is to release cesium from the vaporization waste, and then the purified part can be released into the ocean later on.

The sediment, which contains radioactive waste, can be bound afterwards with concrete, for example.

In accordance with the edicts of the authorities, a certain amount of active waste is allowed to escape into the ocean by Imatran Voima. "That amount is the equivalent of 2 percent of the radioactivity that arises from the radiation in nature," Antti Ruuskanen of Imatran Voima explains.

"If all the containers holding vaporization waste were to be emptied into the ocean at the same time, the quantities would be so small that they would be under the legal limit," Ruuskanen says.

But they will not do that because of environmental considerations.

Various Kinds of Waste

According to Antti Ruuskanen, the waste situation on Hastholmen is entirely under control. The spent fuel waste is transported to the Soviet Union at five-year intervals. The next shipment will be made a little less than two years from now.

The power plant waste itself consists of various components. There is "garbage waste," which means used clothing, gloves, pieces of wood and plastic. Resin waste consists of round, plastic balls the size of pinheads that filter impurities out of the water. Then there is the vaporization waste--the waste that comes into being when they clean the processing water.

The power plant waste is stored in the power plant itself until it is finally buried in the hill on Hastholmen.

Both the resinous compounds and the vaporization waste are buried with limecrete before final storage.

Arvi Ruuskanen says that plans for a special facility for that purpose have been completed, but that it is not being built at the present time because the amounts of waste are so small now.

Volume Is Decreasing

In spite of the fact that the new purification system is in existence now, they are not going to use it if the waste situation continues to be the same as it is now, they say at Imatran Voima. The system was developed in consideration of the possibility that there will be an increase in the amount of vaporization waste containing cesium in the future.

The advantage of the purification method is, primarily, the fact that the volume of waste is decreasing considerably, and consequently the need for storage space is decreasing, too. If one releases the radioactive element cesium from 300 cubic meters of waste, for example, one gets 10 cubic meters of cesium waste. The rest can be released into the ocean later on.

9266

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POLL FINDS INCREASING OPPOSITION TO FIFTH NUCLEAR PLANT

Helsinki HELSINGIN SANOMAT in Finn'sh 17 May 84 p 29

[Unsigned article: "Opposition to Nuclear Power Addition Increased"]

[Text] Three-fourths of the Finns are negatively inclined towards a fifth nuclear power plant. According to an opinion poll taken by Finland's Gallup, 39 percent of the Finns consider acquisition of a fifth nuclear power plant completely unnecessary and 35 percent somewhat unnecessary. Thus 74 percent of those interviewed were in opposition. Fourteen percent considered the nuclear power plant necessary, and 3 percent of those interviewed considered it indispensable.

According to the poll, opposition to a nuclear power addition has clearly expanded in four years. In 1980, 61 percent of those interviewed had a negative standpoint.

Over 80 percent of the supporters of the Greens and the SKDL [Finnish People's Democratic League] oppose a fifth nuclear power plant, according to the new opinion poll. Nearly 80 percent of the supporters of the Center Party and the Social Democrats had a negative standpoint. Backers of the Coalition Party had a viewpoint different from the others. Fifty-five percent of them opposed and 41 percent supported a nuclear power addition.

Women more flatly reject nuclear power than men. Eighty-four percent of the women interviewed and 64 percent of the men had a negative standpoint. The opinion poll was conducted at the end of April and the beginning of May. Roughly 1,200 citizens of voting age participated in it.

12327

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NUCLEAR WASTE-BURIAL TESTING ADVANCES

Helsinki HELSINGIN SANOMAT in Finnish 19 May 84 p 15

[Unsigned article: "Experimental Pit for Nuclear Waste Being Completed in Lavia"]

[Text] Tampere (HELSINGIN SANOMAT)--Drilling of TVO's [Industry's Power] thousand-meter-deep experimental pit in Lavia's Katosuo comes to an end next week. The company estimates that next summer one or two auxiliary pits, the depths of which are 100-300 meters, will probably be drilled in the vicinity of the pit now made.

According to engineer Veijo Ryhanen, the pits are being drilled in order to find a proper storage place for spent nuclear fuel. By the end of next year TVO is supposed to choose 5 to 10 areas from which the final storage place for Olkiluoto's nuclear waste will be selected.

The residents of Lavia now doubt that the pit will be a permanent storage place for nuclear waste. The municipal government has been given the task of clarifying whether the possible placement of a nuclear waste supply in Katosuo could be prevented by drawing up for the area a general plan aimed at recreational use. Rauma-Repola owns the experimental pit area.

Within a short time the municipality will begin negotiations on the possibilities of a plan shelter with the Ministry of Environment, the regional planning alliance and the provincial government, among others.

Tip of Drill Soon at 900 Meters

On Thursday the experimental drilling advanced to a depth of over 860 meters. The depth of the pit was originally projected at 700 meters, but when the drilling progressed without difficulties TVO decided to continue the pit directly to a thousand meters.

"A thousand meters is the maximum depth which we also require for a proper storage place. In Lavia we now have the possibility of making investigations at this depth," said Ryhanen.

With the help of the auxiliary pits to be drilled possibly in the summer, seismic investigations can be made of the rocks between the pits, according to Ryhanen. "In recent years this procedure has been developed in different parts of the world, and for several years TVO had been involved in the corresponding so-called Stripa project in Sweden."

From a hole of nearly six centimeters a rock sample four centimeters thick is raised. According to Ryhanen, at this stage only the type of stone and the extent of cracks in the rock can be stated.

"The number of cracks fluctuates at different depths, but on the average each meter has a few of them. In these aspects the Katosuo rock is quite typical of the Finnish rock base," feels Ryhanen.

The sample centimeters drilled from the rock will come in for precise scientific investigations. As soon as the experimental pit is ready, investigations will begin at the drilling site itself.

12327

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BOLKESTEIN CALLS FOR MORE NUCLEAR POWER PLANTS

The Hague ANP NEWS BULLETIN in English 6 Jun 84 p 2

[Text]

M i d d e l b u r g, June 5 - Foreign Trade Minister Frits Bolkestein called here last night for an expansion of nuclear energy in the Netherlands as an important boost to Dutch industry.

He said during a working visit last night he saw opportunities for the De Schelde shipyard and engineering company (KMS) at nearby Flushing to export sophisticated components for nuclear power stations to China.

The minister, who returned here last Thursday from talks in Peking, said new expertise in the field of nuclear energy should not be lost to Dutch industry by using it only in foreign projects.

An expansion of Holland's own nuclear energy facilities would allow Dutch industry to maintain its international market position in nuclear technology, Bolkestein said.

He noted that China planned to build many 20,000 megawatt nuclear energy plants in the near future. Although the actual plant construction would probably be handled by the United States, Bolkestein said KMS could supply important parts for this nuclear project as well.

Public Debate

The Netherlands has only two nuclear power stations and a recent broadly-based public debate showed the majority of the Dutch oppose more nuclear power plants in Holland.

Bolkestein said that instead of abiding by the outcome of the debate, the government would be better advised to pursue a nuclear energy policy of its own.

He said the 27 million guilders spent by the economics ministry on the debate was not wasted money since the results had been of 'great informative value'.

But the second chamber could in the future better solve such problems on its own, he said, since that would be much less expensive and more efficient.

CSO: 5100/2570

NETHERLANDS

BRIEFS

LUBBERS FOR NUCLEAR ENERGY--The Hague, 18 June--Holland could profit both economically and environmentally from the increased use of nuclear energy, Prime Minister Ruud Lubbers said at the weekend. In an interview with his Christian Democratic Party's official publication 'CDA Actueel', Lubbers said nuclear energy was cleaner than coal, no more expensive than other forms of energy and the dangers involved in the disposal of nuclear waste had been reduced to acceptable levels. He also said he felt the results of a recently-released public opinion study on energy sources, which indicated that the majority of Dutch people were against a greater role for nuclear energy, would be different if the study was carried out now. Lubbers said the public now saw nuclear energy in a rather different light after the recent attention paid to the problem of acid rain. [Text] [The Hague ANP NEWS BULLETIN 29 Jun 84 p 7]

CSO: 5100/2573

YUCEL ON NUCLEAR PLANNING FOR AKKUYU REACTOR

Istanbul MILLIYET in Turkish 23 May 84 p 2

[Article by Behcet Yucel, former director of Turkish Electricity Board]

[Text] Statistical tables indicate that animal and vegetable wastes are still among our energy resources. In 1982, energy derived from those sources was roughly equal to our production of hydraulic energy. While energy is being derived from animal waste in our country, there are also efforts to increase hydraulic energy and coal production. With regard to future energy production, natural gas, geothermal energy, and nuclear energy in particular top the agenda.

It is known that in October of last year separate letters of intent were issued to three different firms to build one nuclear power station each. We have been following from press reports that negotiations are still continuing at various levels.

Global Situation

In the 1950s nuclear power was seen as the most reliable and convenient energy source of the future. Thus, various countries started nuclear energy programs with great zeal. During the 1970s there have been notable increases in the number of nuclear stations as well as their capacity.

In the aftermath of the 1973 oil crisis, however, a somewhat excessive tendency towards building nuclear power stations has been observed instead of oil-fuelled power stations. During that period experts were predicting that by the end of the century at least half the global production of electricity would be generated by nuclear reactors. However, these optimistic estimates were not borne out in later years, and there has been a quick drop in new orders for nuclear reactors. The major reasons for this are high building costs, and presently unresolved technical problems in the construction and operation of nuclear reactors. To these we can add questions related to security and public concern over environmental issues. The problem of eliminating nuclear waste - or to be more straightforward 'radioactive garbage' - is yet to be resolved.

Missed Opportunity

The Akkuyu district of Silifke was selected as the location of the first nuclear reactor nine years ago as a result of studies initiated by the Turkish Electricity Board. Later, draft projects and bid specifications were prepared in a comprehensive manner, and international bids were invited for a 600 MW reactor. These activities took two years. About the middle of 1977, Swedish firms won the bid having made the most suitable offer and by providing the necessary credit. The contract negotiations which had started in 1978 were carried to the second half of 1980 due to changing governments and administrators.

With the subsiding of negative public sentiments towards nuclear power stations in Sweden, the Swedish firm which was exasperated by the long-drawn negotiations viewed this as an opportunity to opt out of the deal. When the option period ended they cancelled the credit. Thus, despite getting very close to a firm agreement over the first nuclear power station, opportunities were not properly utilized.

Rationale of Nuclear Power Stations

The rationale of building nuclear power stations in our country boils down to two major points:

- Urgency of entry into nuclear technology,
- Need for new energy resources in view of the expected saturation of the lignite and hydraulic resources by the 1990s.

In view of the delays in ongoing projects and energy plants under construction, the exhaustion point (of our resources used in generating electricity) has been postponed to the end of the century. By intensifying the exploration new reserves may be added to the known ones. Moreover, changes in certain criteria would mean an increase in our hydraulic potential.

The construction of a nuclear power station takes eight years. If preliminary studies, analyses of the location, and the time taken up by the bidding are considered, this time period may exceed ten years. Due to the long construction period interest charges tend to be high, and escalating costs may lead to a doubling of the original estimates.

The external financing costs of three nuclear power stations 1000 MW each (some of which are under negotiation) total \$4.5 billion in terms of first estimates, at current prices.

The first nuclear power station is more important than the others. Since our country needs a string of nuclear stations to be installed one after the other until the end of the century, how the first nuclear station is handled assumes added importance.

Our major aim should be to gain experience in the project, construction and operational stages of nuclear plants which require delicate technology and application; to develop the necessary manpower in this field, and to establish the support industries that would sustain nuclear technology. The first nuclear station will serve these purposes. How could we otherwise handle several nuclear power stations at once?

Our success would depend upon the estimation of the precise quantity of uranium reserves in Turkey. Yet another question is the close monitoring of developments in nuclear technology. These developments take place so rapidly that some of the early designs run the danger of being outmoded.

This being the case it is somewhat impossible to understand why one should invite tenders for three different types of nuclear stations. It is as if we are engaging in something that we have lots of experience about, as if this were just another run-of-the-mill transaction.

Conclusion

In conclusion, we could say that since we need to install large numbers of nuclear stations as of the end of the century it is imperative that we possess adequate industrial infrastructure and manpower. The policy concerning the first nuclear station should be established without delay. Otherwise the production of nuclear energy which we hail as our salvation, but which has a complicated technology, costly construction, and unreliable fuel sources, carry dangers for not so prosperous countries like ourselves.

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